IN THE SPECIFICATION

- Please amend the **TITLE** of the application as filed as follows:

~~System and Method for Coupling Ultrasound Generating Elements to Circuitry~~

Ultrasound System with Cableless Coupling Assembly

- Please amend paragraph **[0001]** of the application as filed as follows:

~~CROSSREFERENCE~~ CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part application of ~~the U.S.~~ United States patent application number ~~Ser. No.~~ 09/860,209, entitled "Miniaturized Ultrasound Apparatus and Method ~~Application~~," filed May 18, 2001 and now United States patent number 6,569,102 ~~by Mir A. Imran, Glen W. McLaughlin, William D. Lipps, and James M. Brennan, assigned to Novasonics, Inc.~~, which ~~in turn~~ is a continuation application of ~~U.S.~~ United States patent application ~~Ser. No.~~ 09/378,175, entitled "Miniaturized Ultrasound Apparatus and Method," filed August 20, 1999[[,]] and now United States patent number ~~U.S. Pat. No.~~ 6,251,073 ~~B1, having the same title, inventive entity and assignee, and including embodiments having a cableless connection~~. This ~~Application~~ application is also related to ~~the U.S. Patent Application~~ United States patent application number 10/211,391, entitled[[,]] "Broad Beam Imaging," and now United States patent number 6,685,245 ~~by Glen W. McLaughlin, assigned to the same assignee, in that the invention of "Broad Beam Imaging" can be used with the present invention~~.

- Please amend paragraph **[0013]** of the application as filed as follows:

[0013] An embodiment of the [[The]] invention provides a miniaturized ultrasound system generating and receiving unit such as a motherboard with two-dimensional signal addressing capability[[.]] whereby first ~~First~~ connector 104, cable 106, and second connector 108 of the prior art [[FIG. 1]] device in FIG. 1 can be eliminated. The system may have a system motherboard coupled via ~~connected with~~ a cableless coupling to a transducer array. In one embodiment, the cableless coupling is also wireless (*e.g.*, using the radio-frequency spectrum for transmitting and receiving data and signals). The system may include a two-dimensional surface interconnection between the transducer array and the signal generation and/or detection [[of the]] system, which eliminates the impractically thick and heavy cable. In one embodiment, the signal generation and/or detection system may be electrically matched to the transducer elements increasing the sensitivity more than were transducer elements not matched to the signal generation and/or detection system. The two-dimensional interconnection on the motherboard ~~maybe~~ may be used without any other two-dimensional interconnection. In another embodiment, the electrical connection to the two-dimensional array elements are made via many flex circuits (*e.g.*, printed circuit patterns using a layer of copper foil over a polymer base allowing for multidimensionality whereby the circuit may move, bend and twist without damage to the conductor), each coming from one row of elements, which may be terminated directly on the motherboard row of pads. Flex circuits should not be confused with ribbon cables (*e.g.*, those cables made of normal, round insulated wires arranged side-by-side and fastened together by a cohesion process to form a flexible ribbon).

- Please amend paragraph **[0046]** of the application as filed as follows:

[0046] The sandwich of active acoustic element 310 and electrical contacts 308 a and b form an acoustic transducing element 312 for generating and/or receiving ultrasound. In

the case of a ~~mirco~~ micro-machined device, the sandwich of active acoustic element 310 and electrical contacts 308 a and b may be replaced by the micro-machined element and its contacts, which may or may not have a sandwich structure. Acoustic transducing element 312 may also include an acoustic matching element 314 and an optional acoustic window 316. Optional acoustic window 316 may provide ~~provides~~ electrical isolation protecting a media of interest, such as a patient, from electrical shock. Optionally, acoustic matching element 314 may provide electrical isolation instead of, or in addition to, the electrical isolation provided by optional acoustic window [[314]] 316. Acoustic matching element 314 may be an assembly of acoustic matching sub-elements. For example, acoustic matching element 314 may have several different layers. Acoustic matching element 314 may be made from materials or mixtures of materials with acoustic matching properties. In an embodiment, acoustic matching element 314 electrically couples electrical contact 308 b to ground sheet 315 thereby providing a return to ground. Alternatively, ground sheet 315 need not be included because optional acoustic window 316 can ~~could~~ be made from a conductive material and act as a ground sheet. Further, alternatively, electrical contacts 308 b [[can]] may be electrically coupled together forming one sheet, for example, that [[can]] may be used for a return to ground. In this alternative embodiment, acoustic matching element 314 may or may not be conductive. Joining electrical contacts 308 b into one sheet increases the difficulty of acoustically isolating transducers 302. ~~However,~~ But if the acoustical impedance of the conductive material joining electrical contacts 308 b is mismatched, for example, acoustic isolation can be achieved despite the joining material. Optional filler 318 may be placed between intermediate elements 306, completely or partially filling the voids or kerfs (*i.e.,* the spaces between transducers 302 ~~are referred to as kerfs~~). Optional filler 318 may be epoxy resin or other polymers and may include additives to modify [[its]] filler characteristics. An optional adhesive 320 ~~maybe~~ may be used to secure transducer 302 via electrical pads 304 to connector 208. Optional adhesive 320 may be insulating or conducting adhesives such as ~~epoxies, polyurethanes, silicones, etc.~~ epoxy, polyurethane, or silicone with or without various additives for different properties.

- Please amend paragraph **[0059]** of the application as filed as follows:

[0059] FIG. 4 is an alternative embodiment 400 of the structure of FIG. 2. Embodiment 400 has intermediate elements 406, which are insulative and coated with a conductor 408 on any number of sides greater than two, including conductive pads 410 a and b located at both ends. Specifically, to explain what is meant by conductor 408 being coated on any number of sides greater than two, conductive pads 410 a and b cover intermediate elements 406 on at least part of each of two of its ends. A portion of conductor 408 must also be placed at least partially on a third side of intermediate elements 406 to form an electrical coupling between conductive pads 410 a and b. Intermediate elements 406 [[can]] <u>may</u> be columns or posts made from a mixture of any of, any combination of, or all of, epoxy, polyurethane, and/or silicone containing dense particles or spheres made from material such as, but not limited to, tungsten and bubbles, low density particles, and/or microspheres. The low density particles and ~~microshperes~~ <u>microspheres</u> [[can]] <u>may</u> be made from glass and/or plastic, for example. Conductor 408 [[can]] <u>may</u> be a thin film that provides electrical interconnection between acoustic transducing elements 312 and electrical pads 304 to which it is bonded or soldered. The conductor 408 [[can]] <u>may</u> be exposed or covered. If [[it]] <u>conductor 408</u> is covered, it may be embedded within, intermediate elements 406 and/or covered by optional film 412. Optional film 412 allows for the removal of any subsequently introduced optional filler 318 by mechanical means, such as dicing wheels, without the danger of damaging conductor 408. Optional film 412 [[can]] <u>may</u> be a thin film of insulating material or the same material as intermediate elements 406. Conductor 408 [[can]] <u>may</u> be replaced by conducting wires or whiskers that may be placed along the edges of, or embedded within intermediate elements 406. Optional filler 318 [[can]] <u>may</u> encapsulate conductor 408 completely, or partially, as shown in FIG. 4. Optional filler 318 may serve the purposes of providing structural integrity and acoustically isolating individual acoustic transducing elements 312. Optional filler 318 [[can]] <u>may</u> be of the same material as the posts used for intermediate elements 406 as long as it is insulative, or does not short

transducers 302[[.]] ~~The~~ ; the higher the electrical conductivity of conductor 408, the lower the ~~signals~~ signal's loss. In one embodiment, the electrical conductivity provided by conductor 408 may be made high enough to minimize signal loss. The total length of intermediate elements 406 in the direction perpendicular to the signal generating and receiving unit 210, and the per length resistance of conductor 408, will determine the total resistance of the individual couplings between the acoustic transducing elements 312 and electrical pads 304. Due to the relatively high conductivity of metallic films or wires, it is practical to increase the thickness of intermediate structure 204, to position the acoustic array surface to touch the patient in a comfortable way. Intermediate elements 406 may serve as posts or columns and can have a cross section of any shape. Intermediate elements 406 can have essentially the same mechanical and acoustical properties as intermediate elements 306, and therefore may have the same composition, except for the lack of the conducting particles in intermediate elements 406. ~~However, (because~~ Because intermediate elements 406 [[can]] may have a lower resistance[[)]], intermediate elements 406 [[can]] may be made taller than intermediate elements 306. ~~Also, the~~ The mechanical properties of intermediate layer 406 may also be slightly different.

- Please amend paragraph **[0068]** of the application as filed as follows:

[0068] Referring to FIG. 11A, in step 1102 the signal generating and receiving unit 210 generates an electrical signal. In step 1104, the electrical signal is ~~cablessly~~ cablelessly coupled via connector 208 and through a possible connector (not shown) and electrical pads 304 to intermediate structure 204. In step 1106, the electrical signal is coupled through intermediate structure 204 to acoustic transducing element 312. In step 1108, acoustic transducing element 312 generates an acoustic signal that is then transmitted via acoustical matching element 314 through optional acoustic window 316.